

An Evaluation of Enhanced Cooling Techniques for High-Heat-Load Absorbers*

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Abstract

Many components of the storage ring and front ends in the third-generation of light sources are subjected to high heat loads from intense x-rays. Temperature rises and thermal stresses in these components must be kept within acceptable limits of critical heat flux and low-cycle fatigue failure. One of the design solutions is to improve heat transfer to the cooling water either by increasing water velocity in the cooling channels or by using turbulators such as porous media, twisted tapes, and wire springs. In this paper we present experimental and analytical results to compare various enhanced cooling techniques for conditions specific to heating from an x-ray fan.

Keywords: heat transfer, high heat load, enhanced cooling, absorbers

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